

Disk Management

Partitions

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fdisk

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File Systems

What You Will Learn

- Partitions
- MBR
- GPT
- Mount points
- fdisk

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- fdisk
- MBR
- GPT

What You Will Learn

- Creating file systems
- Mounting file systems
- Unmount file systems
- How to prepare swap space for use
- File System Table
- Disk UUIDs and Labels

Partitions

- Disks can be divided into parts, called partitions.
- Partitions allow you to separate data.
- Partitioning schemes
 - 1) OS, 2) Application, 3) User, 4) Swap
 - 1) OS, 2) User home directories
 - As a system administrator, you decide.

Partitioning

- Can protect the overall system.
- Keep users from creating outages by using a home directory partition.


```
$ df -h
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/sda2	100G	75G	25G	75%	/
/dev/sda1	488M	111M	342M	25%	/boot
/dev/sda3	10G	10G	0	100%	/home

MBR

- Master Boot Record
- Can only address 2 TB of disk space
- Being phased out by GPT
 - GPT= GUID Partition Table
- 4 Primary Partitions
- Extended partitions allow you to create logical partitions

GPT

- GPT = GUID Partition Table
- GUID = Global Unique Identifier
- Replacing the MBR partitioning scheme
- Part of UEFI
- UEFI = Unified Extensible Firmware Interface
- UEFI is replacing BIOS

GPT

- Supports up to 128 partitions
- Supports up to 9.4 ZB disk sizes
- Not supported by older operating systems
- May require newer or special tools

Mount Points

- A directory used to access the data on a partition
- /(slash) is always a mount point
- /home
 - /home/jason is on the partition mounted on /home
- /export/home
 - /export/home/jason

Mounting over existing data

```
mkdir /home/sarah
```

```
mount /dev/sdb2 /home
```

* You will not be able to see /home/sarah now.

```
umount /home
```

* You can now see /home/sarah again.

Mount Points on Mount Points

/home

/home/jason

fdisk

- Alternatives: gdisk, parted
- Earlier versions of fdisk did not support GPT

`fdisk /path/to/device`

File Systems

- ext = Extended file system
 - ext2, ext3, and ext4 are later releases
 - Often the default file system type
- Other file systems:
 - ReiserFS
 - JFS
 - XFS
 - ZFS
 - Btrfs

mkfs

```
mkfs -t TYPE DEVICE
```

```
mkfs -t ext3 /dev/sdb2
```

```
mkfs -t ext4 /dev/sdb3
```

```
mkfs.ext4 /dev/sdb3
```

mkfs

```
# ls -l /sbin/mkfs*  
/sbin/mkfs  
/sbin/mkfs.btrfs  
/sbin/mkfs.cramfs  
/sbin/mkfs.ext2  
/sbin/mkfs.ext3  
/sbin/mkfs.ext4  
/sbin/mkfs.minix  
/sbin/mkfs.xfs
```

Mounting with mount

mount DEVICE MOUNT_POINT

mount /dev/sdb3 /opt

The mount command

```
# mount
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
tmpfs on /run type tmpfs (rw,nosuid,nodev,mode=755)
...
/dev/sda2 on / type xfs (rw,relatime,attr2,inode64,
noquota)
/dev/sdb3 on /opt type ext4 (rw,relatime,data=ordered)
```

The df command

```
# df -h
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/sda2	198G	1.7G	196G	1%	/
devtmpfs	489M	0	489M	0%	/dev
tmpfs	497M	0	497M	0%	/dev/shm
tmpfs	497M	6.5M	491M	2%	/run
tmpfs	497M	0	497M	0%	/sys/fs/cgroup
/dev/sdb3	484G	73M	459G	1%	/opt

```
#
```

Manual mounts do not persist

In order to make mounts persist between reboots, add an entry in the `/etc/fstab` file.

Unmount with the umount command

umount DEVICE_OR_MOUNT_POINT

```
umount /opt
```

```
umount /dev/sdb3
```


Preparing swap space

```
# mkswap /dev/sdb1
```

```
Setting up swapspace version 1, size = 1048572 KiB  
no label, UUID=619dc6d9-1b0b-4a9a-9df5-bfc343fb8d6e
```

```
# swapon /dev/sdb1
```

```
# swapon -s
```

Filename	Type	Size	Used	Priority
/dev/sda1	partition	2047996	0	-1
/dev/sdb1	partition	1048572	0	-2

/etc/fstab - The File System Table

- Controls what devices get mounted and where on boot.
- Each entry is made up of 6 fields
 - device
 - mount point
 - file system type
 - mount options
 - dump
 - fsck order

Sample /etc/fstab file

#	device	mount point	FS	options	dump	fsck
	/dev/sda2	/	xfs	defaults	0	1
	/dev/sda1	swap	swap	defaults	0	0

Sample /etc/fstab file

```
UUID=dbae4fe7-b06f-4319-85dc-b93ba4a16b17 / xfs defaults 0 1
LABEL=opt /opt ext4 defaults 1 1
/dev/sda1 swap swap defaults 0 0
```

Viewing Labels and UUIDs

```
# lsblk -f
```

NAME	FSTYPE	LABEL	UUID	MOUNTPOINT
sda				
└─sda1	swap		1cb76bec-a1fa-4ac6-8296-c508e936b744	[SWAP]
└─sda2	xfs	root	dbae4fe7-b06f-4319-85dc-b93ba4a16b17	/

```
# blkid
```

```
/dev/sda1: UUID="1cb76bec-a1fa-4ac6-8296-c508e936b744" TYPE="swap"
```

```
/dev/sda2: LABEL="root" UUID="dbae4fe7-b06f-4319-85dc-b93ba4a16b17" TYPE="xfs"
```

Labeling a filesystem.

```
# e2label /dev/sdb3 opt
```

Summary

- mkfs
- mount
- df
- umount
- mkswap
- swapon

Summary

- /etc/fstab
- viewing UUIDs and labels
- creating labels

Summary

- Partitions
- Partition tables
 - MBR
 - GPT
- Mount points
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